

## A Review of the Species of the New World Braconid Genus *Cyclaulacidea* (Hymenoptera) with Key and Descriptions of Nine New Species

JASON W. LEATHERS,\* DARLENE D. JUDD, AND ANDREW V. Z. BROWER

Oregon State University, Department of Zoology, 3029 Cordley Hall, Corvallis OR 97331 USA

\*Author for correspondence: jleathers@cdfa.ca.gov

---

*Abstract.*—The Neotropical parasitic wasp genus *Cyclaulacidea* Quicke & Delobel (Hymenoptera: Braconidae) contains two previously described species from Peru and Brazil that are known to feed on Bruchidae and Curculionidae associated with palms. An examination of Neotropical braconines from 19 insect collections reveals that species of *Cyclaulacidea* are much more widespread. Nine new species of *Cyclaulacidea* are described, and an identification key to the eleven known species is provided. The new species are: *C. pottsae* from Mexico; *C. adairae*, *C. hunteri*, and *C. snyderorum* from Costa Rica; *C. fergusonii* from Panama; *C. picki*, *C. rominus*, and *C. sharkeyi* from Suriname; and *C. riceorum* from Peru and Brazil. The range of *C. bruchivorus* Quicke is expanded from Peru to include Brazil, Bolivia, and Suriname, and that of *C. matilei* Villemant and Simbolotti is expanded from Brazil to Colombia.

---

*Cyclaulacidea* Quicke and Delobel currently contains two species of wasps that are ectoparasitic on Coleoptera feeding on palms (Quicke 1997, Villemant and Simbolotti 2000). *Cyclaulacidea bruchivorus* Quicke has been reared in Peru from *Caryoborus serripes* Sturm (Bruchidae: Pachymerinae) feeding on fruits fallen from *Astrocaryum javarense* Trail ex Drude, *A. chonta* Martins, and *A. macrocalyx* Burret (Quicke and Delobel 1995). *Cyclaulacidea matilei* Villemant and Simbolotti has been reared from *Foveolus* sp. (Curculionidae: Rhynchophorinae: Sphenophorini) feeding in floral bracts of *Euterpe oleracea* C. Martius (Villemant and Simbolotti 2000). Neither species has been documented outside of its type locality country.

*Cyclaulacidea* is part of the *Compsobracon* Ashmead group of Neotropical parasitic wasps (Braconidae: Braconinae), a diverse group of at least 100 species that vary from the enormous, brightly colored species of *Compsobracon* to the tiny and inconspicuous species of *Compsobraconoides* Quicke. The *Compsobracon* group currently

contains 33 described species that share a unique facial sculpture of paired ridges that run from the antennal sockets to the clypeus (Figs. 2, 3, 4) and which are divided into seven genera: *Compsobracon*, *Calobracon* Szépligeti, *Cyclaulax* Cameron, *Compsobraconoides*, *Cyclaulacidea*, *Gracilibracon* Quicke, and *Sacirema* Quicke (Quicke 1997).

### METHODS

*Specimens examined.*—As part of a generic-level revision of the entire *Compsobracon* group, 4,918 specimens of Neotropical Braconinae were borrowed from 19 insect collections. Additionally, the senior author recently had the opportunity to examine type specimens of *C. bruchivorus* and *C. matilei* during a visit to the Musée National d'Histoire Naturelle in Paris. Specimens from the *Compsobracon* group used in this study are marked with unique numbers on their determination labels in the format JL##### to allow the continued association of notes and observed character states with particular specimens.

Table 1. Summary of meristic and continuous measurements in species of *Cyclaulacidea*. L = length, W = width, D = distance, H = height, FW = Fore wing.

	<i>adai.</i>	<i>bruc.</i>	<i>ferg.</i>	<i>hunt.</i>
Length (mm)	7.0-8.3	7.0-12.7	8.6	7.0-7.5
Flagellomeres	42-45	49-63	46	42
Scape L:W	1.5-2.0	1.7-2.2	2.1	1.8-2.1
First:second flagellomere	1.2-1.4	1.2-1.7	1.4	1.3-1.4
First:third flagellomere	1.3-1.6	1.3-1.7	1.5	1.4-1.5
Third flagellomere L:W	1.0-1.3	0.9-1.3	1.5	1.1
Apical flagellomere L:W	1.5-1.8	1.8-2.2	1.8	1.6
Horizontal L eye: L of head behind eye	1.6-2.2	0.9-1.2	1.6	1.5
Diameter posterior ocellus: post-ocellar L	0.9-1.5	1.0-1.5	0.8	1.0-1.2
D between posterior ocellus and eye: post-ocellar L	2.9-3.8	3.4-4.3	2.6	3.9-4.9
Eye H:W	1.2-1.3	1.3-1.4	1.2	1.3-1.4
Eye H:W of face	1.2-1.5	1.1-1.6	1.5	1.4
W of head:W of face	2.2-2.8	2.0-2.8	2.6	2.4
Inter-tentorial D:clypeus H	2.0-2.4	1.8-2.2	2.4	2.2-2.3
Tentorio-ocular D:clypeus H	0.8-1.1	0.8-1.2	0.9	1.1
Face W:H	0.9-1.2	1.0-1.2	0.9	0.9-1.0
Malar space:eye H	0.2-0.3	0.1-0.2	0.2	0.1-0.2
Mesosoma L:H	1.3-1.5	1.4-1.7	1.6	1.4
Propodeal spiracle H:W	2.5-3.3	2.0-2.7	2.3	2.0-2.2
Foretibia L:forefemur L	1.1-1.2	1.1-1.2	1.0	1.1
Foretarsus L:forefemur L	1.5-1.6	1.5-1.7	1.6	1.6
Fore basitarsus L:W	3.7-5.0	3.9-5.7	4.7	4.2-4.8
Fore basitarsus L:second tarsomere L	1.6-1.8	1.5-1.8	2.0	1.6-1.7
Hind femur L:W	3.8-4.2	3.7-4.0	4.0	3.6-4.0
Hind femur L:hind basitarsus L	2.0-2.4	1.6-1.9	1.9	1.8-2.7
Hind tibia:hind basitarsus L	2.5-2.9	2.3-2.8	2.7	2.4-2.7
Outer tibial spur L:basitarsus L	0.5-0.6	0.3-0.5	0.4	0.5
Inner tibial spur L:basitarsus L	0.6-0.7	0.6	0.6	0.7
Hind basitarsus L:W	3.4-4.1	5.4-7.3	4.6	4.0-4.7
FW 1M:1RS L	1.7-2.5	1.5-2.3	2.4	1.9-2.0
FW 2M:r-m L	3.5-4.1	3.1-4.1	4.2	3.4-3.5
FW 1m-cu:r L	1.2-1.6	1.0-1.4	1.3	1.1-1.2
FW 1m-cu:(RS+M)a thickness	1.5-2.2	1.0-2.0	1.5	1.2-1.4
FW 2RS:r-m L	1.3-1.5	1.0-1.2	1.5	1.1-1.2
FW 3RSa:r-m L	3.0-3.4	2.7-3.6	3.3	3.0
FW 3RSa:r L	4.6-6.2	4.5-5.7	4.8	4.8-5.3
FW 3RSb:r L	6.0-7.6	4.4-6.0	5.8	5.1-5.5
FW L	6.9-8.0	8.6-12.0	7.8	7.0-7.5
Hind wing vein R1a:1r-m L	1.3-1.8	1.1-1.4	1.4	1.5-1.6
First tergite L:W	0.9-1.1	0.7-1.2	0.8	0.8-0.9
Second tergite L:W	0.4-0.5	0.4-0.5	0.5	0.4-0.5
Second tergite L:third tergite L	0.7-0.9	0.6-0.8	0.7	0.8-0.9
Third tergite L:W	0.5-0.6	0.5-0.7	0.7	0.5-0.6
Ovipositor:body L	0.8-1.0	1.4-1.5	♂	1.1-1.2

These numbers are included for type specimens in the species descriptions and are included in the distribution section (Appendix 1) for new specimens of *C. bruchivorus* and *C. matilei*.

Because resources for the identification

of New World braconines are sparse and *Cyclaulacidea* was only recently described, specimens of *Cyclaulacidea* are rare in collections. Several of the species described herein are represented only by single specimens. Single specimens were recog-

Table 1. Continued.

<i>mati.</i>	<i>pick.</i>	<i>pott.</i>	<i>rice.</i>	<i>romi.</i>	<i>shar.</i>	<i>synd.</i>
7.0-9.5	10.3	8.0	7.8-10.1	8.8-9.6	8.8-14.1	7.2-9.2
46-54	BR	46	48-52	48-53	54-58	46-52
1.3-2.5	1.8	1.5	1.7-2.1	1.6-1.7	1.9-2.3	1.8-1.9
1.3-1.4	1.3	1.4	1.3-1.5	1.2-1.4	1.2-1.5	1.3-1.4
1.4-1.5	1.3	1.5	1.4-1.6	1.3-1.4	1.4-1.6	1.4
1.1	1.5	1.1	1.2-1.3	1.0-1.1	1.1-1.3	1.1-1.3
1.6-1.8	BR	1.7	1.8-2.9	1.8-1.9	1.8-2.3	1.8-1.9
1.7	0.9	1.5	1.0-1.4	1.4-1.7	0.7-0.8	1.7
1.2	1.6	0.8	0.9-1.2	1.0-1.1	0.9-1.4	0.9-1.1
4.3	5.3	2.9	2.8-4.0	3.5	3.8-5.6	2.9-3.3
1.2	1.3	1.3	1.3-1.4	1.3	1.3-1.5	1.3
1.1-1.3	1.3	1.2	1.2-1.7	1.2	1.0-1.2	1.3
2.0-2.3	2.4	2.3	2.1-2.7	2.2	1.9-2.3	2.3-2.4
2.7-3.2	2.5	2.5	1.9-3.1	2.0-2.3	1.7-2.3	2.5-2.8
1.0-1.5	1.1	1.3	0.7-1.1	1.0-1.1	1.0-1.3	1.1-1.2
1.3	1.0	1.1	0.7-1.1	1.1-1.2	1.1-1.2	1.0-1.1
0.2	0.2	0.2	0.1-0.2	0.2	0.2-0.3	0.2
1.5-1.9	1.6	1.5	1.6-1.7	1.4-1.5	1.4-1.7	1.5-1.6
3.3	1.9	2.0	2.0-2.5	2.7-3.2	1.8-2.4	1.9-2.3
1.1-1.2	1.1	1.2	1.1-1.2	1.1-1.2	1.0-1.2	1.1-1.2
1.4-1.6	1.7	1.6	1.6-1.7	1.6-1.7	1.5-1.7	1.6-1.7
4.3	5.2	4.2	4.3-5.4	3.3-4.3	3.9-5.7	4.5-5.1
1.7	1.7	1.8	1.5-1.8	1.6-1.7	1.7-1.9	1.5-1.8
4.0	4.1	3.8	3.8-4.0	3.7-4.1	3.8-4.2	4.0-4.4
1.8	1.5	1.8	1.6-1.8	1.9-2.1	1.6-1.8	1.7-1.8
2.4	2.6	2.6	2.3-2.7	2.5-2.6	2.5-2.6	2.4-2.6
0.4-0.5	0.3	0.4	0.4-0.5	0.5	0.4	0.4-0.5
0.6	0.5	0.6	0.6	0.6-0.7	0.5-0.6	0.6
6.0	5.5	5.5	5.0-6.2	4.2-4.5	5.2-6.2	4.4-5.2
1.7	2.3	2.1	1.9-2.1	1.5-1.7	1.8-2.1	1.7-2.1
3.3	3.5	3.6	3.3-3.8	3.3-3.8	3.1-3.6	3.2-3.5
1.1-1.3	1.3	1.1	1.0-1.5	1.0	1.2-1.6	0.9-1.3
1.6	1.7	1.8	1.1-2.2	1.5-2.0	1.1-1.7	1.5-1.6
1.1	1.2	1.1	1.2-1.3	1.0-1.2	1.0-1.2	1.1-1.2
2.9	2.9	3.2	2.7-3.2	2.8-3.1	2.9-3.2	2.8-2.9
4.1-4.7	4.8	5.1	4.3-6.2	4.0-4.4	5.0-6.3	3.8-5.4
4.9-5.7	5.4	4.7	5.2-7.2	4.6-5.0	4.6-6.0	4.1-5.4
9.7	9.0	7.6	7.3-8.6	9.0-10.3	8.7-12.8	7.0-9.1
1.5-1.8	1.8	1.5	1.4-1.6	1.4	1.3-1.5	1.2-1.4
0.9-1.2	1.1	0.9	0.8-1.1	0.9-1.0	1.1-1.3	0.8-0.9
0.4-0.8	0.7	0.5	0.5-0.6	0.4-0.5	0.5-0.6	0.4-0.5
0.7	1.4	0.7	0.7-0.9	0.7-0.9	0.7-0.9	0.7-0.8
0.4	0.5	0.6	0.6-0.7	0.5-0.6	0.5-0.7	0.5-0.6
1.0	1.1	1.0	1.2	0.9	0.8-1.1	1.1

nized as new species only when they possessed unique combinations of at least several characters and had a disjunct geographic distribution. All of the known specimens of *Cyclaulacidea* are in good condition, although a few of the older

ones are moderately dusty (e.g., Fig. 3B). Several museums have large collections of unsorted Neotropical braconines (e.g., the American Entomological Institute). There are undoubtedly additional species of *Cyclaulacidea* that await description

when funding is available to curate these accessions.

*Morphology.*—Morphological terminology and character systems examined follow Sharkey and Wharton (1997), with the exception of morphometric characters, which follow van Achterberg (1979). As part of a larger study of the *Compsobracon* group of New World Braconinae, all specimens of *Cyclaulacidea* were examined for a total of 68 discrete, 44 continuous, and 3 meristic morphological characters, as well as 41 color characters. Continuous characters were measured using a Microcode II (Boeckeler Instruments). Length was measured from head to abdomen. Measures of face height were measured from the tentorial pits rather than the top of the clypeus. Meristic and continuous data is included in the species descriptions and summarized in Table 1. The angle  $\theta$  of Fore wing veins C+SC+R and 1RS was estimated using the formula  $\tan^{-1}\theta = ((\text{distance from intersection of 1RS and (RS+M)}\text{a to C+SC+R in a basad direction measured perpendicular to 1RS}) / (\text{length of 1RS}))$  (Fig. 6A). The species descriptions include character states from both holotypes and paratypes. When there is variation in this data holotype information is denoted in square brackets.

In many braconines the clypeus is separated from the rest of the face by a raised ridge (as in Fig. 4A). Furthermore, in some species of *Cyclaulacidea* the clypeus is also elevated such that parts of it are level with this ridge. In the species descriptions 'clypeus partially filled in dorsally' means that the part of the clypeus closest to the face is level with this ridge and the part closest to the labrum appears excavated and is not level with the ridge (as in Fig. 2B).

*Depositories.*—Specimens of *Cyclaulacidea* were found in the following museums. The acronyms used here are taken from Arnett et. al. (1993): California Academy of Sciences, San Francisco, California, USA

(CAS); Entomological Museum, Utah State University, Logan, Utah, USA (EMUS); Rocky Mountain Systematic Entomology Laboratory, University of Wyoming, Laramie, Wyoming, USA (ESUW); Instituto Alexander von Humboldt, Santafé de Bogotá, Colombia (IAVH); Musée National d'Histoire Naturelle, Paris, France (MNHN); Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil (MZSP); Oregon State Arthropod Collection, Oregon State University, Corvallis, Oregon, USA (OSUO); Nationaal Natuurhistorische Museum, Leiden, Netherlands (RMNH); Department of Entomology Insect Collection, Texas A&M University, College Station, Texas, USA (TAMU); National Museum of Natural History, Smithsonian Institution, Washington D.C., USA (USNM).

## RESULTS

Of the 4,918 specimens of Braconinae examined, 1,133 are members of the *Compsobracon* group, but only 41 are members of *Cyclaulacidea*. Additional specimens of *C. bruchivorus* and *C. uatilei* are among these specimens, as are 9 species new to science. No information on host association or other ecological data are recorded on the labels of any specimens of the new species.

## DISTRIBUTION

Specimens of *Cyclaulacidea*, previously documented from only Peru and Brazil, are reported from Mexico, Costa Rica, Panama, Colombia, Suriname, and Bolivia (Fig. 1). The range of *C. bruchivorus* is expanded from Peru to include Brazil, Bolivia, and Suriname (Fig. 1, Appendix 1). The only new specimen of *C. uatilei* bears collection information from Colombia (Fig. 1, Appendix 1).

## SYSTEMATICS

### *Cyclaulacidea* Quicke & Delobel

*Cyclaulacidea* Quicke & Delobel, 1995: 218–219.

*Diagnosis.*—Species of *Cyclaulacidea* can



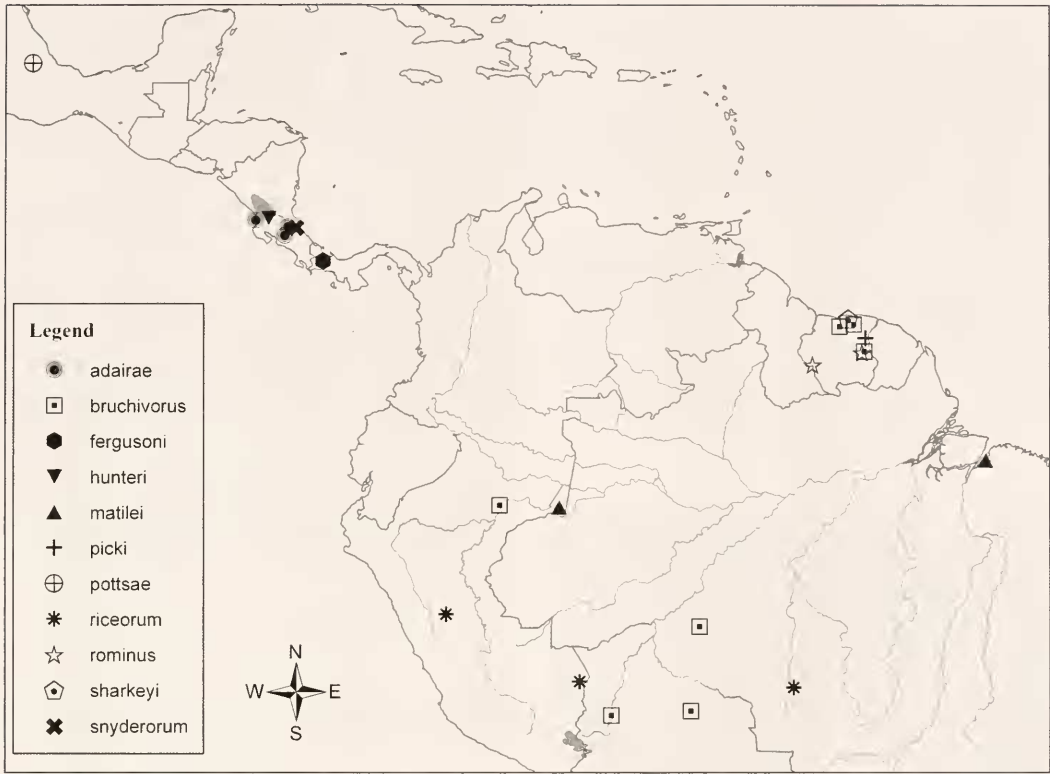


Fig. 1. Distribution map for species of *Cyclaulacidea*.

be distinguished from other genera of Braconinae using the key of Quicke (1997) and by the presence of the following putative synapomorphies: a median ridge on the face is developed into a raised teardrop, chevron, or butterfly-shaped area (Figs. 2, 3, 4) and the first tergite has a strongly raised median rectangular to tongue-shaped area (Figs. 8A, 8B, 8C). One of the new species, *C. adairae*, keys to *Compsobraconoides* in Quicke's key due to the shape of its scape; however, this taxon is much larger than any species of *Compsobraconoides* and possesses the teardrop shaped area on the face and rectangular bump on the first tergite characteristic of *Cyclaulacidea*.

All known species of *Cyclaulacidea* also possess the following combination of characters:

**HEAD:** Pedicel not swollen or heavily sclerotized. Scape lacking basal concavity.

First flagellomere swollen basally toward vertex of head. Apical flagellomere aciculate. Antennal sockets not extended from head, lacking plate-like shelf and enlarged sockets. Vertex of head with smooth depression and groove medially. The face is glabrous and has a pair of main, submedial, longitudinal ridges running from the clypeus to the antennal sockets (Figs. 2, 3, 4). Area between ridges and eyes with ladder-like series of horizontal carinae. Clypeus separated from rest of face by rugose ridge.

**MESOSOMA:** Metanotum mostly smooth. Propodeum lacking median longitudinal carina. Tarsal claw with very small basal lobe. Hind tibia lacking longitudinal depression. Hind telotarsus lacking especially thick setae. Fore wing vein (RS+M)a is strongly curved (Fig. 6). Hind wing with 1 basal hamulus and an area of reduced setosity apicad to vein cu-a.

METASOMA: First tergite trapezoidal, lacking median longitudinal and Y-shaped carinae. Second median tergite lacking raised mid-basal triangular area pointing posteriorly or anteriorly. Apical

branch of suturiform articulation absent. Third tergite smooth, lacking pinched-up area, median longitudinal carina, and mid-basal triangular area. Hypopygium pointed apically.

#### KEY TO SPECIES OF CYCLAULACIDEA

1. Fore wing entirely black (as in Fig. 10B) or black with one clear band (Fig. 12B) . . . . . 2
  - Fore wing with two yellow (as in Fig. 11) or clear bands (as in Fig. 12C) . . . . . 5
- 2(1). Fore wing with one clear band in apical third; maxillary and labial palpomeres black basally, yellowish orange apically; (Fig. 12B) . . . . . *C. pottsae* n. sp.
  - Fore wing entirely black (as in Fig. 10B); maxillary and labial palpomeres entirely black or entirely white . . . . . 3
- 3(2). Terga 4-6 black dorsally, yellowish orange laterally; maxillary and labial palpomeres entirely white; suturiform articulation represented by a deep groove (Fig. 7A); fore tarsus strongly laterally compressed (Figs. 5A, 5B); (Fig. 10B) . . . . . *C. fergusonii* n. sp.
  - Terga 4-6 entirely black; maxillary and labial palpomeres entirely black; suturiform articulation represented by weak groove (as in Fig. 7B); fore tarsus not strongly laterally compressed (as in Figs. 5C, 5D) . . . . . 4
- 4(3). Scape longer dorsally than ventrally (Fig. 5E); rectangular bump on petiole narrowing posteriorly (Fig. 8A); main, submedial, longitudinal facial ridges bowed outward (Fig. 2A); median carina on face developed into tear-drop shaped area medially (Fig. 2A); (Fig. 10D) . . . . . *C. adairae* n. sp.
  - Scape longer ventrally than dorsally (Fig. 5F); rectangular bump on petiole not narrowing posteriorly (Fig. 8B); main, submedial, longitudinal facial ridges diverging outward straight from clypeus to antennal sockets (Fig. 3A); median carina on face developed into chevron to butterfly-shaped area medially (Fig. 3A); (Fig. 10C) . . . . . *C. snyderorum* n. sp.
- 5(1). Mesosoma entirely yellowish orange . . . . . 6
  - Mesosoma entirely black, or mostly black with some yellowish orange on dorsal surface and around margins of pronotum, tegula, and/or sternaulus . . . . . 7
- 6(5). Suturiform articulation barely distinguished from terga 2 and 3, lacking groove (Fig. 7C); bump on petiole tongue-shaped, wider posteriorly than anteriorly (Fig. 8C); main, submedial, longitudinal facial ridges bowed outward (as in Figs. 2A, 2B); ovipositor sheath entirely black; (Fig. 12C) . . . . . *C. picki* n. sp.
  - Suturiform articulation with shallow groove (as in Fig. 7B); bump on petiole rectangular (as in Fig. 8B); main, submedial, longitudinal facial ridges parallel (Fig. 3B) or diverging straight from clypeus to antennal sockets (as in Fig. 3A); ovipositor sheath black with some yellowish orange in apical third (but black at apical tip); (Fig. 12A) . . . . . *C. sharkeyi* n.sp.
- 7(5). Forecoxa usually entirely yellowish orange, sometimes with some black basally; mid femur entirely yellowish orange; Fore wing vein 1cu-a intersects Cu distad 1M (as in Fig. 6A) . . . . . 8
  - Forecoxa usually entirely black, sometimes yellowish orange; mid femur usually entirely black, sometimes with yellowish orange on basal and apical ends, or entirely yellowish orange; Fore wing veins 1M and 1cu-a intersect (interstitial) (as in Fig. 6B) . . . . . 9

- 8(7). Inter-tentorial distance 1.8–2.2 times greater than clypeus height (Fig. 4A); maxillary and labial palpomeres entirely yellowish orange to white; (Fig. 11A) . . . *C. bruchivorus*
- Inter-tentorial distance 2.7–3.2 times greater than clypeus height (Fig. 4B); maxillary and labial palpomeres black basally, yellowish orange apically; (Fig. 11C) . . . *C. matilei*
- 9(7). Costa yellow; fore tibia entirely yellowish orange; (Fig. 11B) . . . . . *C. riceorum* n. sp.
- Costa black; fore tibia entirely black, or mostly black with some yellowish orange in basal and/or apical sixths . . . . . 10
- 10(9). Facial ridges parallel (as in Fig. 3B); second tergite with slightly elevated pinched-up area anteriorly (Fig. 9A); antenna with less than 46 flagellomeres; (Fig. 10A) . . . . .
- . . . . . *C. hunteri* n. sp.
- Facial ridges bowed outward (Fig. 2B); second tergite with strongly pinched-up area anteriorly (Fig. 9B); antenna with 48 to 53 flagellomeres; (Fig. 11D) . . . *C. rominus* n. sp.

SPECIES DESCRIPTIONS

*Cyclaulacidea adirae* Leathers n. sp.

Figs. 2A, 5C, 5D, 5E, 7B, 8A, 10D

*Diagnosis.*—Scape longer dorsally than ventrally (Fig. 5E). Rectangular bump on petiole narrowing posteriorly (Fig. 8A). Terga 1–3 black dorsally, yellowish orange laterally (Fig. 10D).

*Length.*—7.0–8.3 [8.0] mm.

*Head.*—Antenna with 42–45 [44] flagellomeres. Scape longer dorsally than ventrally. Scape lacking apical and pre-apical shelf-like process, [1.5]–2.0 times longer than maximally wide. First flagellomere 1.2–1.4 [1.3] times longer than second flagellomere, 1.3–[1.6] times longer than third flagellomere. Third flagellomere 1.0–1.3 [1.1] times longer than wide. Apical flagellomere 1.5–1.8 [1.6] times longer than wide. Flagellomere length equal to or greater than width. Horizontal length of eye 1.6–[2.2] times longer than length of head behind eye. Transverse diameter of posterior ocellus 0.9–1.5 [1.1] times post-ocellar length. Distance between posterior ocellus and eye 2.9–3.8 [3.5] times post-ocellar length. Longitudinal bump between antennal sockets present. Facial ridges bowed outward. Anterior groove between antennal sockets absent. Area between ridges filled in creating a raised median area. Median carina on face present, developed into raised tear-drop shaped

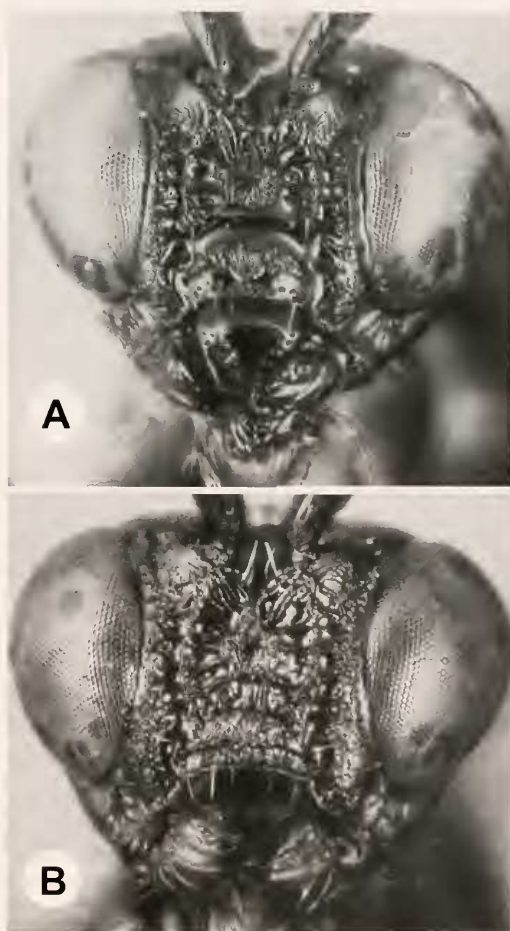


Fig. 2. Face of A) *C. adirae* (JL000100) and B) *C. rominus* (JL000228). Both have facial ridges that are bowed outward and a raised tear-drop shaped area in the center of the face.



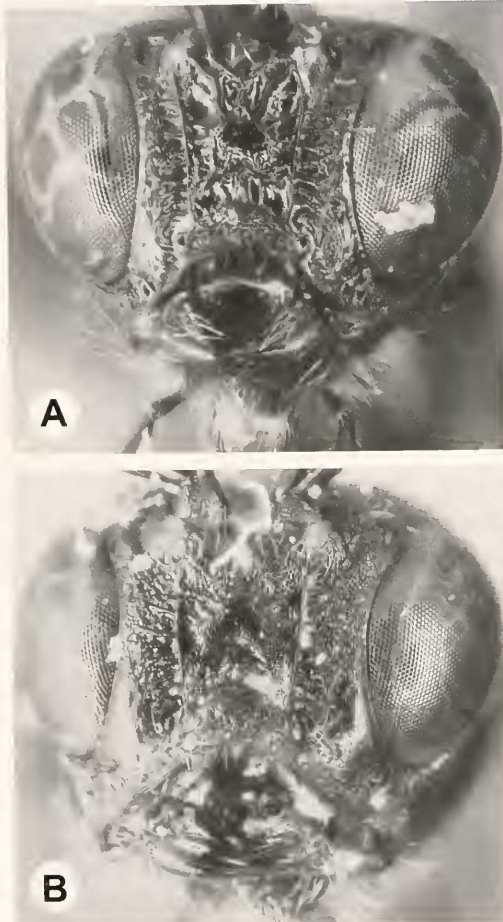


Fig. 3. Face of A) *C. snyderorum* (JL000101) with facial ridges that are diverging outward from the clypeus to the antennal sockets and B) *C. sharkeyi* (JL000203) with facial ridges that are more parallel. Both have raised chevron to butterfly-shaped areas in the center of the face.

area. Area between median carina and ridges with ladder-like series of horizontal carinae. Ridges running at 45° angle from middle ridge to antennal sockets strong. Groove around eyes present, [smooth] or crenulate. Eye height 1.2–[1.3] times greater than eye width, [1.2]–1.5 times greater than width of face. Width of head 2.2–2.8 [2.3] times greater than width of face. Inter-tentorial distance 2.0–2.4 [2.2] times clypeus height. Tentorio-ocular distance 0.8–[1.1] times clypeus height. Clypeus

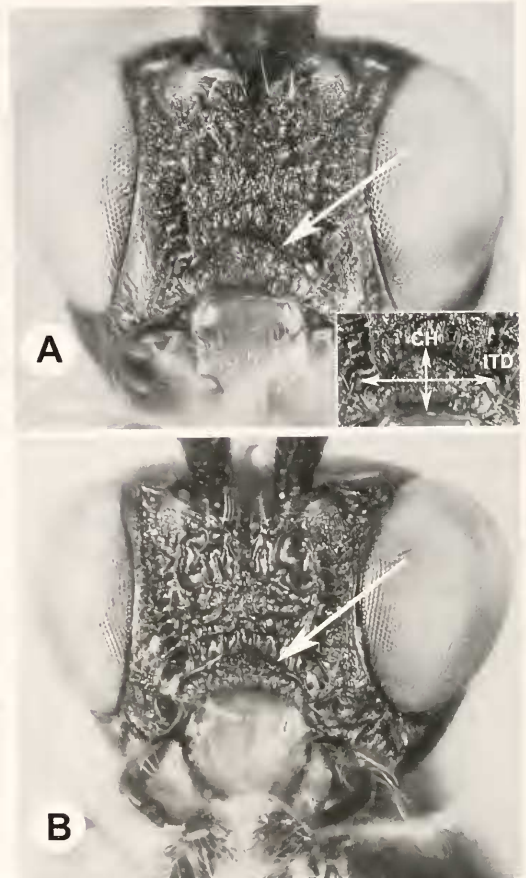


Fig. 4. Face of A) *C. bruchivorus* (JL000047) and B) *C. matilei* (JL000201). The arrow points to the clypeus, the shape of which can be used to distinguish between the two species. CH = clypeus height, ITD = inter-tentorial distance.

[partially filled in dorsally], or completely filled in but uneven. Ventral margin of clypeus concave. Area around clypeus with series of large crenulae and sharp ridge separating from rest of face, or [separated from rest of face by large smooth groove]. Face 0.9–1.2 [1.0] times wider than high. Malar suture paralleled by 2–[5] ridges. Malar space [0.2]–0.3 times eye height.

*Mesosoma*.—Mesosoma 1.3–1.5 [1.4] times longer than high. Pronotum with deep, smooth groove anteriorly. Notaulus not impressed. Border between mesoscutum and scutellum with weak carinate

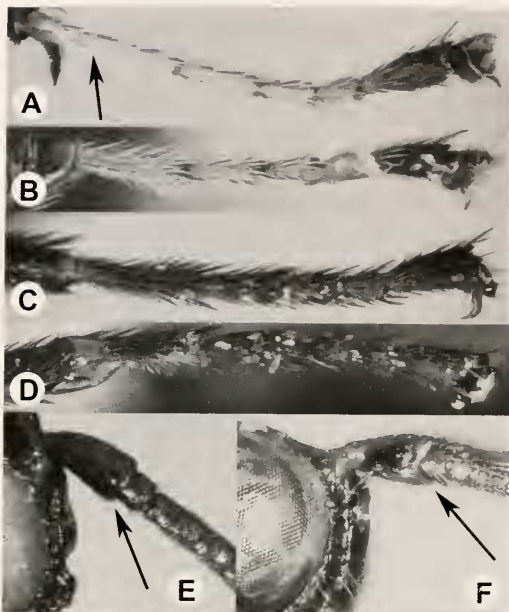


Fig. 5. A) Dorsal and B) lateral images of fore tarsus of *C. fergusonii* (JL000235) and C) dorsal and D) lateral images *C. adairae* (JL000102); arrow indicates relative lateral compression in fore tarsus of *C. fergusonii*. Scape of E) *C. adairae* (JL000102) and F) *C. snyderorum* (JL000107); arrow denotes ventral surface which is not longer than dorsal surface in *C. adairae* but is longer than dorsal surface in *C. snyderorum*.

groove, lacking strong median carina and enlarged median pit. Propodeal spiracle oval to [crescent-shaped], 2.5–3.3 [2.9] times higher than wide.

Fore tibia [1.1]–1.2 times longer than fore femur. Fore tarsus not laterally compressed, [1.5]–1.6 times longer than fore femur. Fore basitarsus [3.7]–5.0 times longer than wide, 1.6–[1.8] times longer than second tarsomere. Hind femur 3.8–4.2 [3.9] times longer than wide, 2.0–[2.4] times longer than basitarsus. Hind tibia 2.5–[2.9] times longer than basitarsus. Outer and inner hind tibial spurs 0.5–[0.6] and 0.6–[0.7] times longer than basitarsus, respectively. Hind basitarsus 3.4–4.1 [3.6] times longer than wide.

Fore wing venation: 1M and 1cu-a intersect. (RS+M)b broken apically. 1M 1.7–2.5 [2.0] times longer than 1RS. 2M 3.5–4.1 [3.6] times longer than r-m. 1m-cu 1.2–1.6

[1.4] times longer than r, 1.5–2.2 [1.6] times as thick as (RS+M)a. 2RS [1.3]–1.5 times longer than r-m. 3RSa [3.0]–3.4 times longer than r-m, 4.6–6.2 [5.3] times longer than r. 3RSb 6.0–7.6 [7.1] times longer than r. C+SC+R and 1RS forming an angle of 67–73° [71°]. Fore wing length 6.9–8.0 [7.9] mm.

Hind wing vein R1a [1.3]–1.8 times longer than 1r-m.

*Metasoma*.—Base of petiole deeply excavated. First tergite with strongly raised rectangular bump. First tergite with lateral carina closely paralleling median bump but not forming notches, with pair of lateral carinae entirely separated from median bump. First tergite [0.9]–1.1 times longer than wide. Border between first and second tergite straight with edges curving anteriorly. Second median tergite with strongly pinched-up area not reaching third tergite. Suturiform articulation with weak, smooth, M-shaped, weakly arched groove; with carina present along anterior margin. Second tergite [0.4]–0.5 times longer than wide, [0.7]–0.9 times longer than third tergite. Third tergite [0.5]–0.6 times longer than wide. Hypopygium with convex dorsal margin. Ovipositor 0.8–[1.0] times body length.

*Color*.—Entirely black except lateral parts of terga 1–3 yellowish orange and sometimes apical parts of mid and hind trochantellus yellowish orange or red. Wings entirely black.

*Distribution and material examined*.—Known from Guanacaste, Alajuela, and Heredia provinces of Costa Rica. 7 ♀♀ 1 ♂ examined.

**Holotype** ♀. COSTA RICA: Guanacaste: 3km SE R. Naranjo, 3–8.iii.1992, F.D. Parker (EMUS—JL000100). **Paratypes**. COSTA RICA: Guanacaste: 3km SE R. Naranjo: 2 ♀♀, 3–8.iii.1992, F.D. Parker (EMUS—JL000102, 000105); 1 ♀, 28.xi–5.xii.1991, F.D. Parker (EMUS—JL000103); 1 ♂, xii.1991, F.D. Parker (EMUS—JL000106). Alajuela: 2 ♀♀, 20.xi.1990, F.D. Parker (EMUS—JL000231, 000232). Heredia: F. La Selva, 3km S. Pto. Viejo: 1 ♀, 14.iii.1980, H.A. Hespeneheide (ESUW—JL000233).



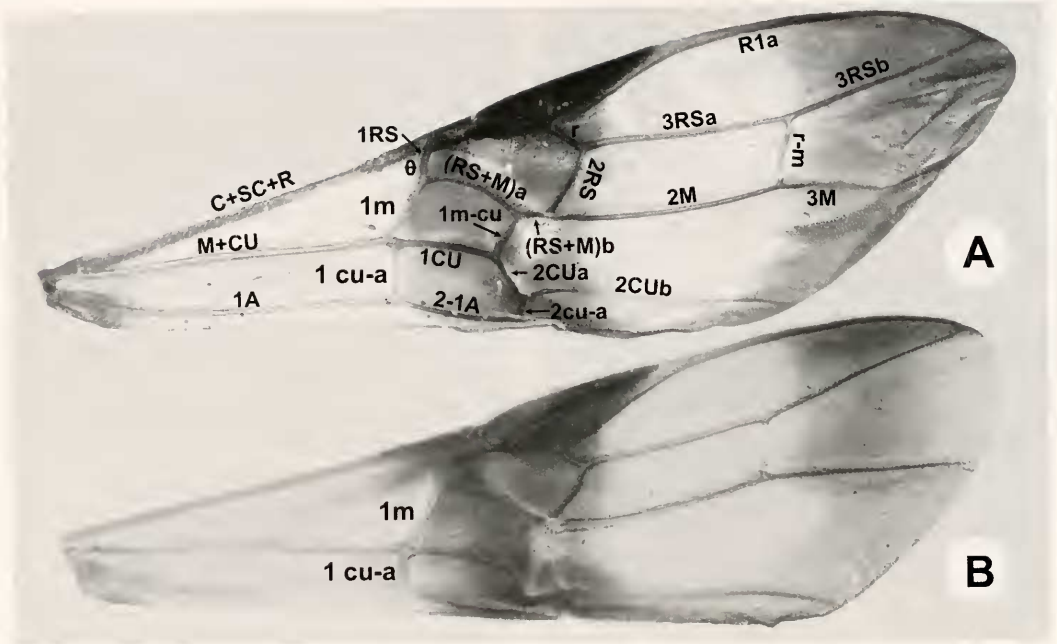


Fig. 6. Fore wing of A) *C. bruchivorus* (JL000246) and B) *C. riccorum* (JL000162).  $\theta$  = the angle of Fore wing veins C+SC+R and 1RS.

*Remarks.*—Coloration appears almost identical to *C. snyderorum* sp. n., but can be consistently distinguished using the diagnostic characters in the key.

*Etymology.*—For Lila Adair for her support of science education at Central Gwinnett High School.

*Cyclaulacidea fergusonii* Leathers n. sp.  
Figs. 5A, 5B, 7A, 10B

*Diagnosis.*—Suturiform articulation with deep groove (Fig. 7A). Facial ridges bowed inward. Terga 4–6 black dorsally, yellowish orange laterally (Fig. 10B).

*Length.*—8.6 mm.

*Head.*—Antenna with 46 flagellomeres. Scape longer ventrally than dorsally. Scape with shelf-like process apically, lacking pre-apical shelf, 2.1 times longer than maximally wide. First flagellomere 1.4 times longer than second flagellomere, 1.5 times longer than third flagellomere. Third flagellomere 1.5 times longer than wide. Apical flagellomere 1.8 times longer than wide. Flagellomere

length equal to or greater than width. Horizontal length of eye 1.6 times longer than length of head behind eye. Transverse diameter of posterior ocellus 0.8 times post-ocellar length. Distance between posterior ocellus and eye 2.6 times post-ocellar length. Longitudinal bump between antennal sockets absent. Facial ridges bowed inward. Deep anterior groove between antennal sockets absent. Area between ridges filled in creating a raised median area. Median carina on face present, developed into raised tear-drop shaped area. Area between median carina and ridges with ladder-like series of horizontal carinae. Ridges running at 45° angle from middle ridge to antennal sockets strong. Groove around eyes present and smooth. Height of eye 1.2 times greater than eye width and 1.5 times greater than width of face. Width of head 2.6 times greater than width of face. Intertentorial distance 2.4 times clypeus height. Tentorio-ocular distance 0.9 times longer than clypeus high. Clypeus com-

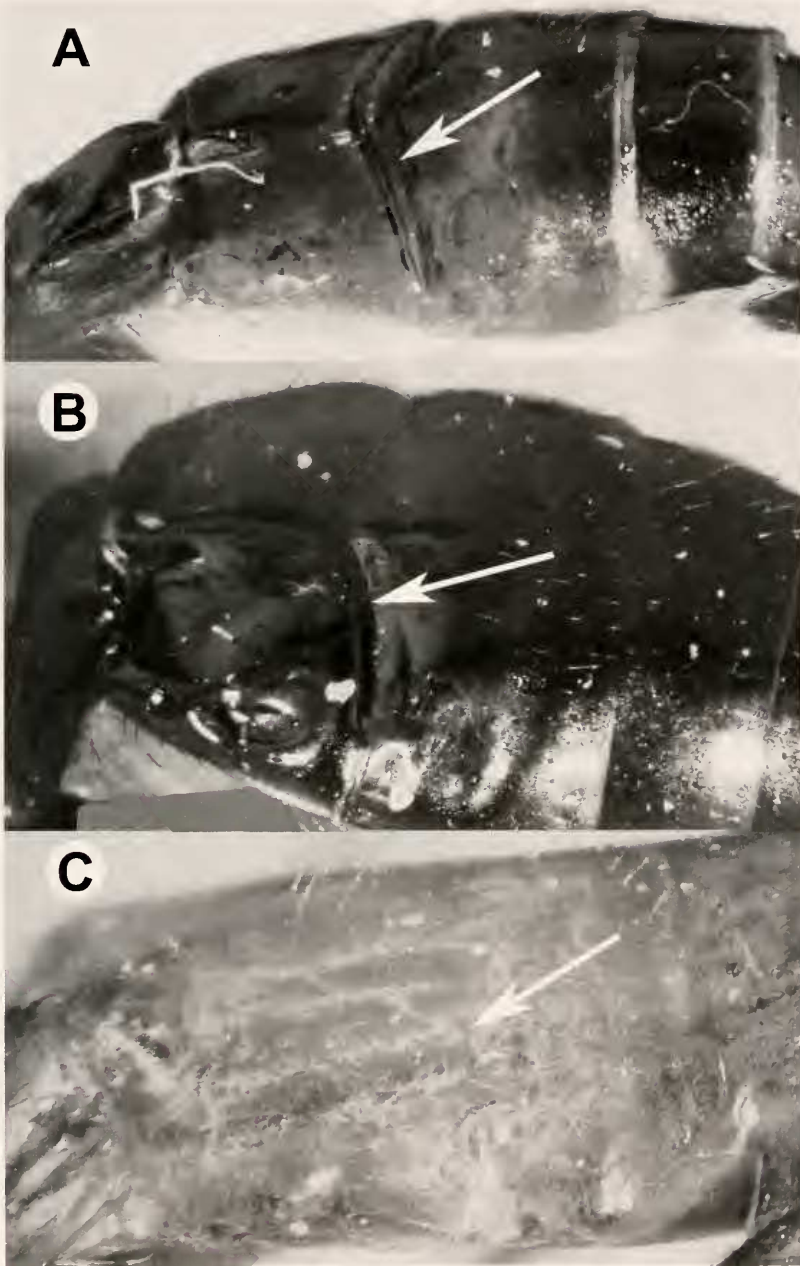


Fig. 7. Metasomal syntergite 2+3 with A) deep groove on *C. fergusonii* (JL000235), B) shallow groove on *C. adairae* (JL000102), C) lack of groove on *C. picki* (JL000202). Arrow indicates suturiform articulation.

pletely filled in but uneven. Ventral margin of clypeus concave. Area around clypeus with series of large crenulae and sharp ridge separating from rest of face. Face 0.9 times wider than high. Malar su-

ture paralleled by 6 ridges. Malar space 0.2 times eye height.

*Mesosoma*.—Mesosoma 1.6 times longer than high. Pronotum with deep, smooth groove anteriorly. Notaulus weakly im-



Fig. 8. First tergite of A) *C. adairae* (JL000232) with rectangular bump narrowing posteriorly, B) *C. snyderorum* (JL000107) with rectangular bump, and C) *C. picki* (JL000202) with tongue-shaped bump.

pressed. Border between mesoscutum and scutellum with carinate groove, lacking median carina and enlarged median pit. Propodeal spiracle crescent-shaped, 2.3 times higher than wide.

Fore tibia 1.0 times the length of fore femur. Fore tarsus strongly laterally compressed, 1.6 times longer than fore femur. Fore basitarsus 4.7 times longer than wide, 2.0 times longer than second tarsomere. Hind femur 4.0 times longer than wide, 1.9 times longer than basitarsus. Hind tibia 2.7 times longer than basitarsus. Outer and inner hind tibial spurs 0.4 and 0.6 times longer than basitarsus, respectively. Hind basitarsus 4.6 times longer than wide.

Fore wing venation: 1M and 1cu-a intersect. (RS+M)b broken apically. 1M 2.4 times longer than 1RS. 2M 4.2 times longer than r-m. 1m-cu 1.3 times longer than r, 1.5 times as thick as (RS+M)a. 2RS 1.5 times longer than r-m. 3RSa 3.3 times longer than r-m, 4.8 times longer than r. 3RSb 5.8 times longer than r. C+SC+R and 1RS forming an angle of 67°. Fore wing length 7.8 mm.

Hind wing vein R1a 1.4 times longer than 1r-m.

*Metasoma*.—Base of petiole deeply excavated. First tergite with strongly raised rectangular bump. First tergite with lateral carina closely paralleling median bump but not forming notches, with pair of lat-

eral carina entirely separated from median bump. First tergite 0.8 times longer than wide. Border between first and second tergite straight with edges curving anteriorly. Second tergite with strongly pinched-up area not reaching third tergite. Suturiform articulation with deep, smooth, M-shaped, weakly arched groove; carina along anterior margin present. Second tergite 0.5 times longer than wide, 0.7 times longer than third tergite. Third tergite 0.7 times longer than wide.

*Color*.—Black except as follows: mouthparts white, pronotum with yellowish orange stripe on ventral third, fore tarsus and mid tarsus yellowish orange with telotarsus black, hind trochantellus mostly black with some red apically, tergum 1 yellowish orange laterally, terga 2 and 3 reddish orange, terga 4–6 yellowish orange laterally. Wings entirely black.

*Distribution and material examined*.—Known only from type specimen. 1♂ examined.

*Holotype* ♂. PANAMA: N.Panama, 1050m, Fortuna, Chiriquí, 22–28.v.1979, H. Wolda (RMNH—JL000235).

*Etymology*.—For George Ferguson for his generous support of this project and systematic entomology at Oregon State University.



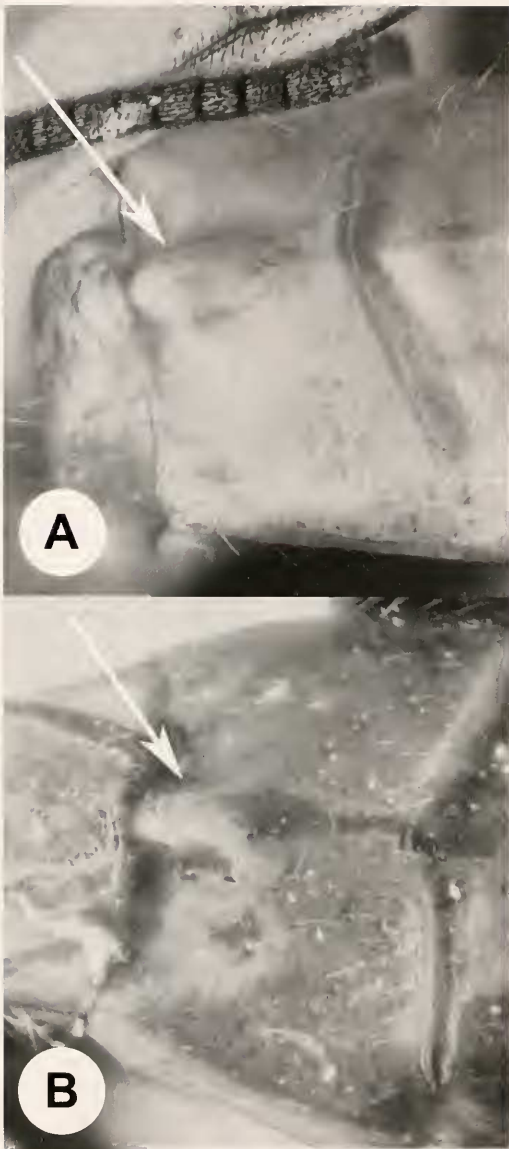


Fig. 9. Second tergite of A) *C. hunteri* (JL000110) and B) *C. rominus* (JL000228). Arrow denotes pinched-up areas.

*Cyclaulacidea hunteri* Leathers n. sp.

Figs. 9A, 10A

*Diagnosis.*—Fore wing banded: clear, black, clear, black (Fig. 10A). Maxillary and labial palpomeres white. Horizontal length of eye (in dorsal view) 1.5 times longer than length of head behind eye. Antenna with 42 flagellomeres.

*Length.*— [7.0]–7.5 mm.

*Head.*—Antenna with 42 flagellomeres. Scape longer ventrally than dorsally. Scape with shelf-like process apically, lacking pre-apical shelf. Scape [1.8]–2.1 times longer than maximally wide. First flagellomere [1.3]–1.4 times longer than second flagellomere, [1.4]–1.5 times longer than third flagellomere. Third flagellomere 1.1 times longer than wide. Apical flagellomere [1.6] times longer than wide. Flagellomere length equal to or greater than width. Horizontal length of eye 1.5 times longer than length of head behind eye. Transverse diameter of posterior ocellus 1.0–[1.2] times post-ocellar length. Distance between posterior ocellus and eye 3.9–[4.9] times post-ocellar length. Facial ridges parallel. Anterior groove between antennal sockets very weak. Area between ridges filled in creating a raised median area. Median carina on face present, developed into raised tear-drop shaped area. Area between median carina and ridges with ladder-like series of horizontal carinae. Ridges running at 45° angle from middle ridge to antennal sockets strong. Groove around eyes present and crenulate. Eye height [1.3]–1.4 times greater than eye width, 1.4 times greater than width of face. Width of head 2.4 times greater than width of face. Inter-tentorial distance [2.2]–2.3 times clypeus height. Tentorio-ocular distance 1.1 times longer than clypeus high. Clypeus partially filled in dorsally. Ventral margin of clypeus concave. Area around clypeus with series of large crenulae and sharp ridge separating from rest of face. Face [0.9]–1.0 times wider than high. Malar suture paralleled by 2 ridges. Malar space 0.1–[0.2] times eye height.

*Mesosoma.*—Mesosoma 1.4 times longer than high. Pronotum with deep, smooth groove anteriorly. Notaulus not impressed. Border between mesoscutum and scutellum with carinate groove, lacking median carina or enlarged median pit; median part of groove sometimes filled in.



Fig. 10. Automontage® lateral images of A) *C. hunteri* (JL000110), B) *C. fergusonii* (JL000235), C) *C. snyderorum* (JL000101), and D) *C. adairae* (JL000105). Ovipositor sheaths were removed from A. Magnification = 7.2×.

Propodeal spiracle oval, 2.0–[2.2] times higher than wide.

Fore tibia 1.1 times longer than fore femur. Fore tarsus not laterally compressed,

1.6 times longer than fore femur. Fore basitarsus [4.2]–4.8 times longer than wide, [1.6]–1.7 times longer than second tarsomere. Hind femur 3.6–[4.0] times longer



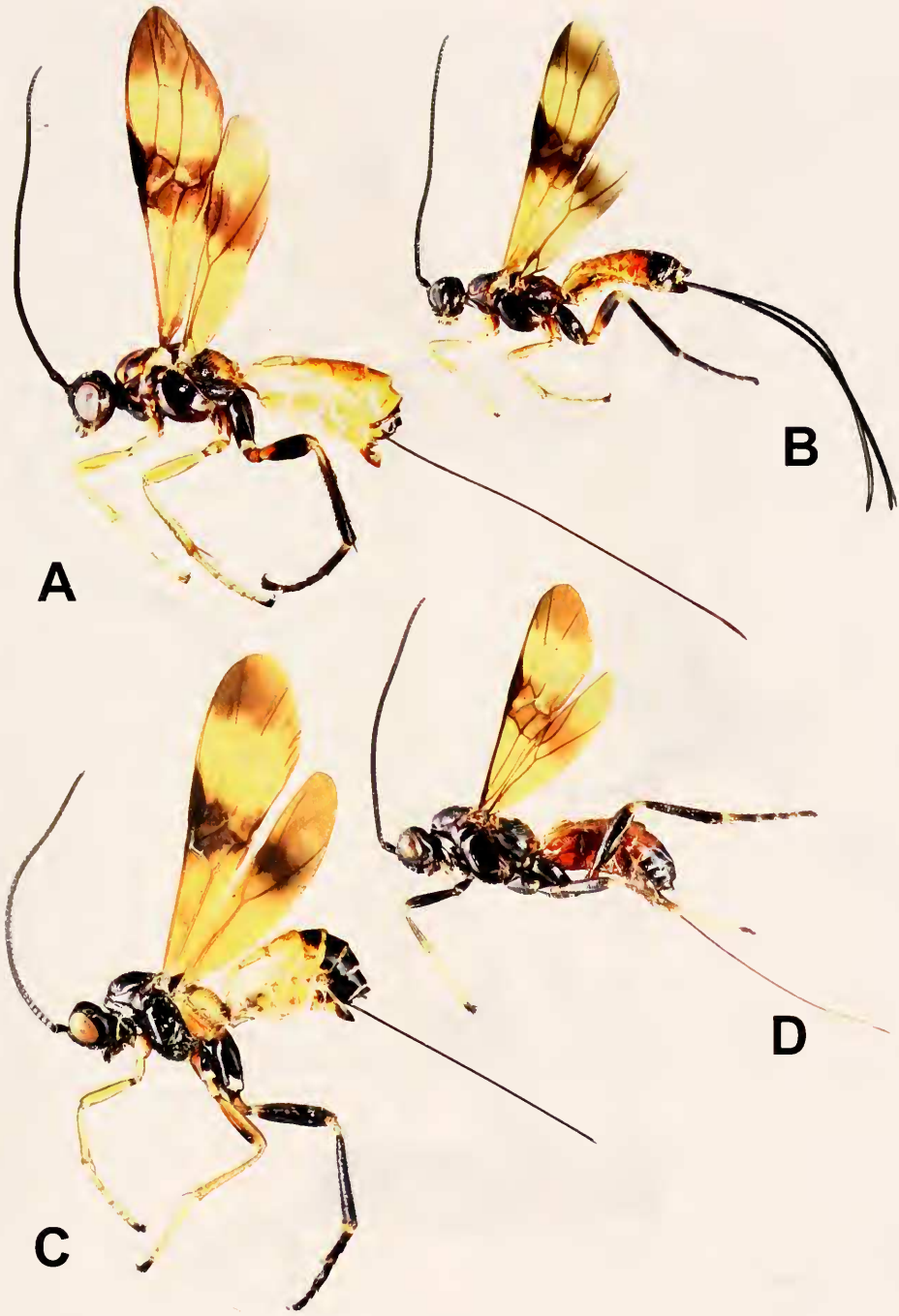


Fig. 11. Automontage® lateral images of A) *C. bruchiivorus* (JL000246), B) *C. riccorum* (JL000162), C) *C. matilei* (JL000201), and D) *C. rominus* (JL000228). Ovipositor sheaths were removed from A, C, and D. Magnification = 4.7×.

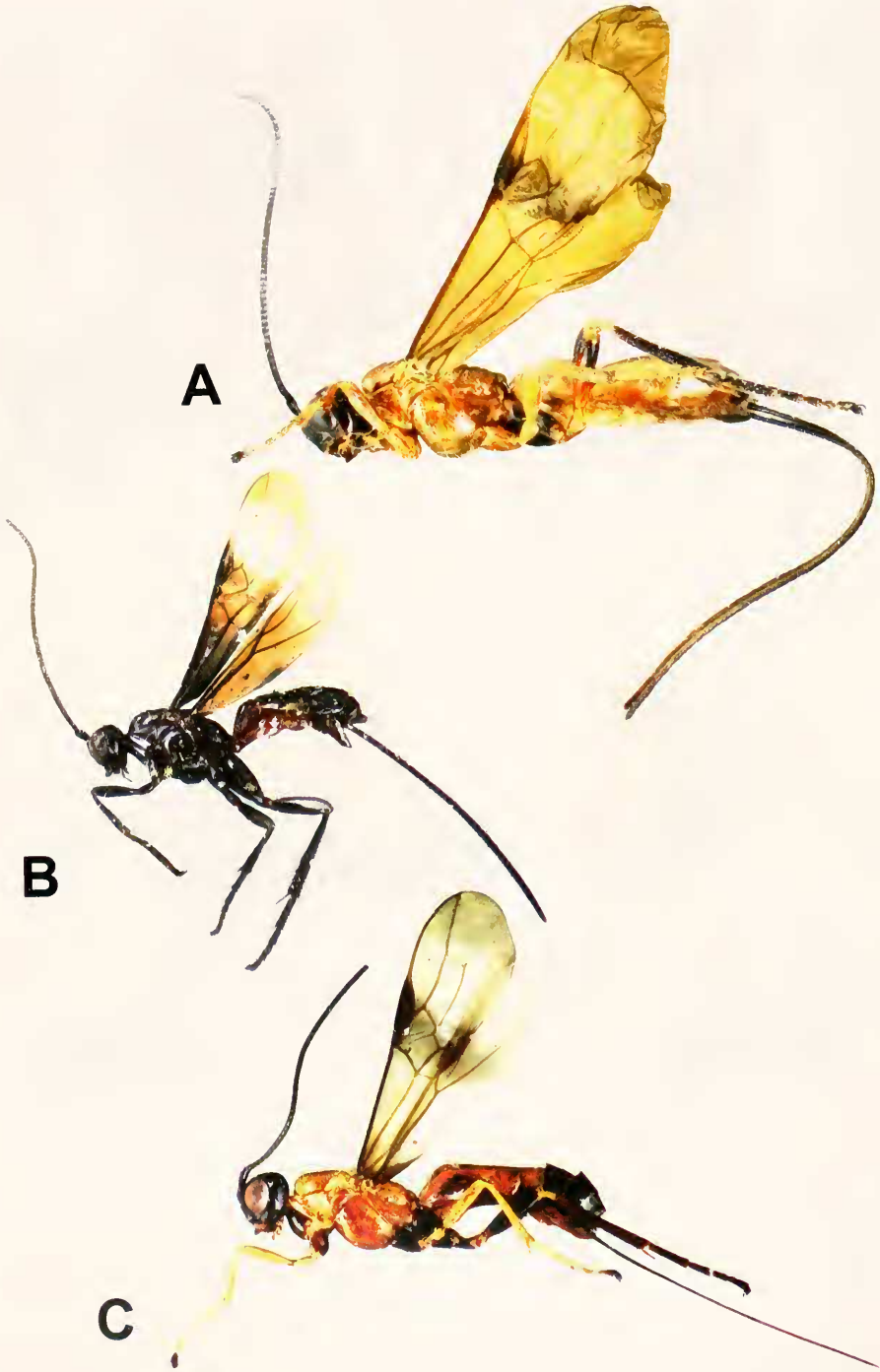


Fig. 12. Automontage<sup>®</sup> lateral images of A) *C. sharkeyi* (JL000236), B) *C. pottsae* (JL000243), and C) *C. picki* (JL000202). Ovipositor sheaths were removed from B and C. Magnification = 5.1 $\times$ .

than wide, 1.8–[2.7] times longer than basitarsus. Hind tibia 2.4–[2.7] times longer than basitarsus. Outer and inner hind tibial spurs 0.5 and 0.7 times length of basitarsus, respectively. Hind basitarsus 4.0–[4.7] times longer than wide.

Fore wing venation: 1M and 1cu-a intersect. (RS+M)b broken apically. 1M 1.9–[2.0] times longer than 1RS. 2M 3.4–[3.5] times longer than r-m. 1m-cu 1.1–[1.2] times longer than r, [1.2]–1.4 times as thick as (RS+M)a. 2RS 1.1–[1.2] times longer than r-m. 3RSa 3.0 times longer than r-m, 4.8–[5.3] times longer than r. 3RSb 5.1–[5.5] times longer than r. C+SC+R and 1RS forming an angle of 72°. Fore wing length [7.0]–7.5 mm.

Hind wing vein R1a [1.5]–1.6 times longer than 1r-m.

*Metasoma*.—Base of petiole deeply excavated. First tergite with strongly raised rectangular bump. First tergite with lateral carina closely paralleling median bump but not forming notches, lacking pair of lateral carina entirely separated from median bump. First tergite [0.8]–0.9 times longer than wide. Border between first and second tergite straight with edges curving anteriorly. Second tergite smooth, with slightly elevated pinched-up area anteriorly. Suturiform articulation with weak, smooth, V-shaped, weakly arched groove; with carina present along anterior margin. Second tergite [0.4]–0.5 times longer than wide, [0.8]–0.9 times longer than third tergite. Third tergite [0.5]–0.6 times longer than wide. Hypopygium with convex dorsal margin. Ovipositor 1.1–[1.2] times body length.

*Color*.—Black except as follows: maxillary and labial palpomeres white, metanotum sometimes yellowish orange, propodeum yellowish orange, fore tarsus yellowish orange but telotarsus black, terga 1–4 yellowish orange. Fore wing banded clear, black, clear, black; hind wing yellow in basal half, black apically.

*Distribution and material examined*.—Known only from type locality in the Al-

ajuela province of Costa Rica. 2 ♀♀ examined.

**Holotype** ♀. COSTA RICA: Alajuela: 20km S. Upala, 22–31.x.1991, F.D. Parker (EMUS—JL000109). **Paratype**. 1 ♀, COSTA RICA: Alajuela: 20km S. Upala, 16.x.1990, F.D. Parker (EMUS—JL000110).

*Etymology*.—For Mark D. Hunter of The University of Georgia.

*Cyclaulacidea picki* Leathers n. sp.

Figs. 7C, 8C, 12C

*Diagnosis*.—Suturiform articulation barely distinguished from remainder of metasomal syntergum 2+3 (Fig. 7C). Strongly raised bump on petiole tongue-shaped (Fig. 8C). Median ridge on face developed into tear-drop shaped area (as in Figs 2A, 2B).

*Length*.—10.3 mm.

*Head*.—Antenna broken after 46<sup>th</sup> flagellomere. Scape longer ventrally than dorsally. Scape with shelf-like process apically, lacking pre-apical shelf, 1.8 times longer than maximally wide. First flagellomere 1.3 times longer than second flagellomere and 1.3 times longer than third flagellomere. Third flagellomere 1.5 times longer than wide. Flagellomere length equal to or greater than width. Horizontal length of eye 0.9 times longer than length of head behind eye. Transverse diameter of posterior ocellus 1.6 times post-ocellar length. Distance between posterior ocellus and eye 5.3 times post-ocellar length. Longitudinal bump between antennal sockets present. Facial ridges bowed outward. Deep anterior groove between antennal sockets absent. Area between ridges not filled in, level with rest of face. Median carina on face present, developed into raised tear-drop shaped area. Area between median carina and ridges with ladder-like series of horizontal carinae. Ridges running at 45° angle from middle ridge to antennal sockets strong. Groove around eyes present and smooth. Eye height 1.3 times greater than eye width, 1.3 times greater than width of face. Width of head 2.4 times greater than

width of face. Inter-tentorial distance 2.5 times clypeus height. Tentorio-ocular distance 1.1 times longer than clypeus high. Clypeus partially filled in dorsally. Ventral margin of clypeus concave. Area around clypeus not differentiated from rest of face. Face 1.0 times wider than high. Malar suture paralleled by 8 ridges. Malar space 0.2 times eye height.

*Mesosoma*.—Mesosoma 1.6 times longer than high. Pronotum with weak groove anteriorly. Notaulus not impressed. Border between mesoscutum and scutellum with carinate groove, lacking median carina and enlarged median pit. Propodeal spiracle crescent-shaped, 1.9 times higher than wide.

Fore tibia 1.1 times longer than fore femur. Fore tarsus not laterally compressed, 1.7 times longer than fore femur. Fore basitarsus 5.2 times longer than wide, 1.7 times longer than second tarsomere. Hind femur 4.1 times longer than wide, 1.5 times longer than basitarsus. Hind tibia 2.6 times longer than basitarsus. Outer and inner hind tibial spurs 0.3 and 0.5 times longer than basitarsus, respectively. Hind basitarsus 5.5 times longer than wide.

Fore wing venation: 1M and 1cu-a intersect. (RS+M)b broken apically. 1M 2.3 times longer than 1RS. 2M 3.5 times longer than r-m. 1m-cu 1.3 times longer than r, 1.7 times as thick as (RS+M)a. 2RS 1.2 times longer than r-m. 3RSa 2.9 times longer than r-m, 4.8 times longer than r. 3RSb 5.4 times longer than r. C+SC+R and 1RS forming an angle of 71°. Fore wing length 9.0 mm.

Hind wing vein R1a 1.8 times longer than 1r-m.

*Metasoma*.—Base of petiole deeply excavated. First tergite with strongly raised tongue-shaped bump. First tergite lacking lateral carina adjacent to median bump, with pair of lateral carina entirely separated from median bump. First tergite 1.1 times longer than wide. Border between first and second tergite straight with edges

curving anteriorly. Second tergite smooth, with slightly elevated pinched-up area anteriorly. Suturiform articulation barely distinguished from remainder of syntergite, lacking groove, M-shaped, weakly arched; lacking carina along anterior margin. Second tergite 0.7 times longer than wide 1.4 times longer than third tergite. Third tergite 0.5 times longer than wide. Hypopygium with convex dorsal border. Ovipositor 1.1 times body length.

*Color*.—Yellowish orange and black. Head black with maxillary and labial palpomeres yellowish orange.

Mesosoma yellowish orange except propleuron black. Fore and mid legs yellowish orange except both coxae black and tarsi yellowish orange with telotarsus black. Hind leg black except some yellowish orange on basal part of tibia. Fore wing banded: black, yellow, black, yellow, black, costa black. Hind wing banded: yellow, black, clear.

Terga 1–4 yellowish orange. Terga 5–8 and ovipositor sheath black.

*Distribution and material examined*.—Known only from type specimen. 1♀ examined.

*Holotype* ♀. SURINAME: Suriname Exp. 1948–1949, Nassau Mts., Malowijne, 15.ii.1949, D.C. Geijskes (RMNH—JL000202).

*Remarks*.—This species is very strange and may not be a member of *Cyclaulacidea*. Although it has the tear-drop shaped median area of the face, a putative synapomorphy for *Cyclaulacidea*, it lacks the well-developed suturiform articulation and rectangular bump on the first tergite that all other species of *Cyclaulacidea* possess.

*Etymology*.—For John Pickering of The University of Georgia.

*Cyclaulacidea pottsae* Leathers n. sp.

Fig. 12B

*Diagnosis*.—Fore wing black with one clear stripe. Hind wing black with clear apical tip. Terga 1–7 black dorsally, reddish orange laterally (Fig. 12B).



*Length.*—8.0 mm.

*Head.*—Antenna with 46 flagellomeres. Scape longer ventrally than dorsally. Scape with shelf-like process apically, lacking pre-apical shelf, 1.5 times longer than maximally wide. First flagellomere 1.4 times longer than second flagellomere, 1.5 times longer than third flagellomere. Third flagellomere 1.1 times longer than wide. Apical flagellomere 1.7 times longer than wide. Flagellomere length equal to or greater than width. Horizontal length of eye 1.5 times longer than length of head behind eye. Transverse diameter of posterior ocellus 0.8 times post-ocellar length. Shortest distance between posterior ocellus and eye 2.9 times post-ocellar length. Longitudinal bump between antennal sockets present. Facial ridges diverging outward straight from clypeus to antennal sockets. Deep anterior groove between antennal sockets absent. Area between ridges not filled in, level with rest of face. Median carina on face present, developed into raised tear-drop shaped area. Area between median carina and ridges with ladder-like series of horizontal carinae. Ridges running at 45° angle from middle ridge to antennal sockets strong. Groove around eyes present and crenulate. Eye height 1.3 times greater than eye width, 1.2 times greater than width of face. Width of head 2.3 times greater than width of face. Inter-tentorial distance 2.5 times clypeus height. Tentorio-ocular distance 1.3 times longer than clypeus high. Clypeus completely filled in but uneven. Ventral margin of clypeus concave. Area around clypeus with series of large crenulae and sharp ridge separating from rest of face. Face 1.1 times wider than high. Malar suture paralleled by 4 ridges. Malar space 0.2 times eye height.

*Mesosoma.*—Mesosoma 1.5 times longer than high. Pronotum with deep, smooth groove anteriorly. Notaulus not impressed. Border between mesoscutum and scutellum with carinate groove, lacking median carina and median area not en-

larged into a median pit. Propodeal spiracle oval, 2.0 times higher than wide.

Fore tibia 1.2 times longer than fore femur. Fore tarsus not laterally compressed, 1.6 times longer than fore femur. Fore basitarsus 4.2 times longer than wide, 1.8 times longer than second tarsomere. Hind femur 3.8 times longer than wide, 1.8 times longer than basitarsus. Hind tibia 2.6 times longer than basitarsus. Outer and inner hind tibial spurs 0.4 and 0.6 times longer than basitarsus, respectively. Hind basitarsus 5.5 times longer than wide.

Fore wing venation: 1M and 1cu-a intersect. (RS+M)b broken apically. 1M 2.1 times longer than 1RS. 2M 3.6 times longer than r-m. 1m-cu 1.1 times longer than r, 1.8 times as thick as (RS+M)a. 2RS 1.1 times length of r-m. 3RSa 3.2 times longer than r-m, 5.1 times longer than r. 3RSb 4.7 times longer than r. C+SC+R and 1RS forming an angle of 78°. Fore wing length 7.6 mm.

Hind wing vein R1a 1.5 times longer than 1r-m.

*Metasoma.*—Base of petiole deeply excavated. First tergite with strongly raised rectangular bump. First tergite with lateral carina closely paralleling median bump but not forming notches, lacking pair of lateral carina entirely separated from median bump. First tergite 0.9 times longer than wide. Border between first and second tergite straight with edges curving anteriorly. Second tergite with strongly pinched-up area not reaching third tergite. Sutureform articulation with weak, smooth, M-shaped, weakly arched groove; with carina present along anterior margin. Second tergite 0.5 times longer than wide, 0.7 times longer than third tergite. Third tergite 0.6 times longer than wide. Hypopygium with flat dorsal border. Ovipositor 1.0 times body length.

*Color.*—Mostly black except maxillary and labial palpomeres yellowish orange apically, margins of eyes yellowish orange, and terga 1–7 reddish orange later-



ally. Fore wing black with one clear stripe. Hind wing black with clear apical tip.

*Distribution and material examined.*—Known only from type specimen. 1 ♀ examined.

*Holotype* ♀. MEXICO: Orizaba, 1867, O. Sichel, (MNHN—JL000243).

*Etymology.*—For Martha Potts of The University of Kentucky.

*Cyclaulacidea riceorum* Leathers n. sp.

Figs. 6B, 11B

*Diagnosis.*—Fore wing veins 1M and 1cu-a intersect. Hind tarsus black but basal part of basitarsus orange. Ovipositor 1.2 times body length. Horizontal length of eye (in dorsal view) 1.0–1.4 times longer than length of head behind eye. Fore tibia entirely yellowish orange (Fig. 11B).

*Length.*—7.8–[10.1] mm.

*Head.*—Antenna with 48–[52] flagellomeres. Scape longer ventrally than dorsally, with shelf-like process apically, lacking pre-apical shelf, 1.7–[2.1] times longer than maximally wide. First flagellomere 1.3–1.5 [1.4] times longer than second flagellomere and 1.4–[1.6] times longer than third flagellomere. Third flagellomere [1.2]–1.3 times longer than wide. Apical flagellomere [1.8]–2.9 times longer than wide. Flagellomere length equal to or greater than width. Horizontal length of eye [1.0]–1.4 times longer than length of head behind eye. Transverse diameter of posterior ocellus 0.9–[1.2] times post-ocellar length. Shortest distance between posterior ocellus and eye 2.8–[4.0] times post-ocellar length. Longitudinal bump between antennal sockets present. Facial ridges parallel. Deep anterior groove between antennal sockets very weak. Area between ridges not filled in, level with rest of face, or filled in creating a raised median area. Median carina on face present, developed into raised tear-drop shaped area. Area between median carina and ridges with ladder-like series of horizontal carinae. Ridges running at 45° angle from

middle ridge to antennal sockets strong. Groove around eyes present and crenulate. Eye height [1.3]–1.4 times greater than eye width, 1.2–1.7 [1.3] times greater than width of face. Width of head 2.1–2.7 [2.2] times greater than width of face. Inter-tentorial distance 1.9–3.1 [2.0] times clypeus height. Tentorio-ocular distance 0.7–1.1 [0.9] times longer than clypeus high. Clypeus partially filled in dorsally. Ventral margin of clypeus concave. Area around clypeus with series of large crenulae but lacking ridge, or [with series of large crenulae and sharp ridge separating from rest of face]. Face 0.7–1.1 [0.8] times wider than high. Malar suture paralleled by 1–4 [3] ridges. Malar space 0.1–[0.2] times eye height.

*Mesosoma.*—Mesosoma 1.6–[1.7] times longer than high. Pronotum with deep, smooth groove anteriorly. Notaulus not impressed. Border between mesoscutum and scutellum with carinate groove. Border between mesoscutum and scutellum lacking median carina and enlarged median pit. Propodeal spiracle [oval] to crescent-shaped, 2.0–2.5 [2.2] times higher than wide.

Fore tibia 1.1–[1.2] times longer than fore femur. Fore tarsus not laterally compressed, [1.6]–1.7 times longer than fore femur. Fore basitarsus 4.3–5.4 [5.2] times longer than wide, 1.5–1.8 [1.6] times longer than second tarsomere. Hind femur 3.8–[4.0] times longer than wide, [1.6]–1.8 times longer than basitarsus. Hind tibia [2.3]–2.7 times longer than basitarsus. Outer and inner hind tibial spurs [0.4]–0.5 and 0.6 times longer than basitarsus, respectively. Hind basitarsus 5.0–6.2 [6.0] times longer than wide.

Fore wing venation: 1M and 1cu-a intersect. (RS+M)b broken apically. 1M 1.9–2.1 [2.0] times longer than 1RS. 2M 3.3–[3.8] times longer than r-m. 1m-cu 1.0–1.5 [1.2] times longer than r, 1.1–2.2 [1.5] times as thick as (RS+M)a. 2RS 1.2–[1.3] times longer than r-m. 3RSa 2.7–[3.2] times longer than r-m, 4.3–6.2 [5.0] times longer

than r. 3RSb [5.2]–7.2 times longer than r. C+SC+R and 1RS forming an angle of 72–78° [74°]. Fore wing length 7.3–[8.6] mm.

Hind wing vein R1a [1.4]–1.6 times longer than 1r-m.

*Metasoma*.—Base of petiole deeply excavated. First tergite with strongly raised rectangular bump. First tergite with lateral carina closely paralleling median bump but not forming notches, lacking pair of lateral carina entirely separated from median bump. First tergite 0.8–1.1 [1.0] times longer than wide. Border between first and second tergite straight with edges curving anteriorly. Second tergite smooth, with slightly elevated pinched-up area anteriorly. Suturaform articulation with weak, smooth, V-shaped, weakly arched groove; with carina along anterior margin. Second tergite [0.5]–0.6 times longer than wide, 0.7–0.9 [0.8] times longer than third tergite. Third tergite 0.6–[0.7] times longer than wide. Hypopygium with convex dorsal border. Ovipositor 1.2 times body length.

*Color*.—Black and yellow. Head black except maxillary and labial palpomeres and sometimes areas around margins of eyes and posterior to malar suture yellowish orange.

Mesosoma black except sometimes dorsal parts of propodeum yellowish orange. Forecoxa, trochanter, trochantellus, and femur black or yellowish orange. Fore tibia yellowish orange. Fore tarsus yellowish orange but telotarsus black. Mid coxa black, or yellowish orange, or mostly yellowish orange with some black basally. Mid trochanter black, or yellowish orange. Mid trochantellus yellowish orange. Mid femur black, or yellowish orange, or mostly black, with some yellowish orange on both ends. Mid tibia yellowish orange, or yellowish orange but black in apical quarter. Mid tarsus mostly yellowish orange but telotarsus black. Hind coxa and trochanter black. Hind trochantellus yellowish orange. Hind femur black, or black in apical half, yellowish orange basally, or

mostly black with some yellowish orange by trochanter. Hind tibia black, or mostly black but yellowish orange basally. Hind tarsus black but basal part of basitarsus orange. Fore wing banded: yellow, black, yellow, black, costa yellow. Hind wing yellow in basal half, black apically, or banded: yellow, black, yellow.

Terga 1–3 yellowish orange. Tergum 4 yellowish orange anteriorly, black posteriorly. Tergum 5 black, or yellowish orange anteriorly, black posteriorly. Terga 6–8 and ovipositor sheath black.

*Distribution and material examined*.—Known from Peru and Brazil. 2♀♀, 4♂♂ examined.

*Holotype* ♀. PERU: Madre de Dios: Rio Tambopata Reserve, 30km (air) SW Puerto Maldonado, 290m, 25–30.iv.1984, W.J. Pulawski (CAS—JL000094).

*Paratypes*. PERU: 1♀, Madre de Dios: Rio Tambopata Reserve, 30km (air) SW Puerto Maldonado, 290m, 25–30.iv.1984, W.J. Pulawski (CAS—JL000162); Monzon Valley, Tingo Maria, E.I. Schlinger & E.S. Ross: 1♂ 2.xi.1954 (CAS—JL000240), 1♂ 19.x.1954 (CAS—JL000241), 1♂ 3.xi.1954 (CAS—JL000242). BRAZIL: 1♂, Utiariti (325m), Rio Papagaio, viii.1961, K. Lenko (MZSP—JL000244).

*Etymology*.—For Harold and Leona Rice for their generous support of this research and systematic entomology at Oregon State University.

### *Cyclaulacidea rominus* Leathers n. sp.

Figs. 2B, 11D

*Diagnosis*.—Fore wing banded yellow, black, yellow, black; costa black (Fig. 11D). Mid femur entirely black. Facial ridges bowed outward (Fig. 2B). Propodeal spiracle crescent-shaped, [2.7]–3.2 times higher than wide.

*Length*.— [8.8]–9.6 mm.

*Head*.—Antenna with [48]–53 flagellomeres. Scape longer ventrally than dorsally. Scape without any shelf-like process apically, or with shelf-like process apically, lacking pre-apical shelf. Scape 1.6–[1.7] times longer than maximally wide. First flagellomere [1.2]–1.4 times longer than second flagellomere, [1.3]–1.4 times longer than third flagellomere. Third flagello-

mere 1.0–[1.1] times longer than wide. Apical flagellomere 1.8–[1.9] times longer than wide. Flagellomere length [equal to or greater than width], or distinctly less than width. Horizontal length of eye 1.4–[1.7] times longer than length of head behind eye. Transverse diameter of posterior ocellus 1.0–[1.1] times post-ocellar length. Distance between posterior ocellus and eye 3.5 times post-ocellar length. Longitudinal bump between antennal sockets present. Facial ridges bowed outward. Deep anterior groove between antennal sockets very weak. Area between ridges not filled in, level with rest of face. Median carina on face present, developed into raised tear-drop shaped area. Area between median carina and ridges with ladder-like series of horizontal carinae. Ridges running at 45° angle from middle ridge to antennal sockets strong. Groove around eyes present and crenulate. Eye height 1.3 times greater than eye width, 1.2 times greater than width of face. Width of head 2.2 times greater than width of face. Intertentorial distance 2.0–[2.3] times clypeus height. Tentorio-ocular distance 1.0–[1.1] times longer than clypeus high. Clypeus partially filled in dorsally. Ventral margin of clypeus concave. Area around clypeus with series of large crenulae and sharp ridge separating from rest of face. Face 1.1–[1.2] times wider than high. Malar suture paralleled by 2 ridges. Malar space 0.2 times eye height.

*Mesosoma*.—Mesosoma [1.4]–1.5 times longer than high. Pronotum with deep, smooth groove anteriorly. Notaulus not impressed. Border between mesoscutum and scutellum lacking groove, or [with carinate groove]. Border between mesoscutum and scutellum lacking median carina and not enlarged into a median pit. Propodeal spiracle crescent-shaped, [2.7]–3.2 times higher than wide.

Fore tibia [1.1]–1.2 times longer than fore femur. Fore tarsus not laterally compressed, [1.6]–1.7 times longer than fore femur. Fore basitarsus [3.3]–4.3 times lon-

ger than wide, [1.6]–1.7 times longer than second tarsomere. Hind femur 3.7–[4.1] times longer than wide, 1.9–[2.1] times longer than basitarsus. Hind tibia [2.5]–2.6 times longer than basitarsus. Outer and inner hind tibial spurs 0.5 and [0.6]–0.7 times longer than basitarsus, respectively. Hind basitarsus [4.2]–4.5 times longer than wide.

Fore wing venation: 1M and 1cu-a intersect. (RS+M)b broken apically. 1M 1.5–[1.7] times longer than 1RS. 2M 3.3–[3.8] times longer than r-m. 1m-cu 1.0 times longer than r, 1.5–[2.0] times as thick as (RS+M)a. 2RS 1.0–[1.2] times longer than r-m. 3RSa 2.8–[3.1] times longer than r-m, [4.0]–4.4 times longer than r. 3RSb 4.6–[5.0] times longer than r. C+SC+R and 1RS forming an angle of 73°. Fore wing length [9.0]–10.3 mm.

Hind wing vein R1a 1.4 times longer than 1r-m.

*Metasoma*.—Base of petiole deeply excavated. First tergite with strongly raised rectangular bump. First tergite with lateral carina closely paralleling median bump but not forming notches, lacking pair of lateral carina entirely separated from median bump. First tergite 0.9–[1.0] times longer than wide. Border between first and second tergite [straight with edges curving anteriorly], or completely rounded. Second tergite with strongly pinched-up area not reaching third tergite. Suturiform articulation with weak, smooth, V-shaped, weakly arched groove; with carina along anterior margin. Second tergite 0.4–[0.5] times longer than wide, 0.7–[0.9] times longer than third tergite. Third tergite [0.5]–0.6 times longer than wide. Hypopygium with flat to [convex] dorsal border. Ovipositor 0.9 times body length.

*Color*.—Head black except maxillary and labial palpomeres black basally, yellowish orange apically, or entirely yellowish orange.

Mesopleuron mostly black. Metanotum yellowish orange. Propodeum yellowish orange, or black laterally, yellowish or-



ange dorsally. Metapleuron black, or mostly black with some yellowish orange by hind wing. Legs entirely black except as follows: fore tibia black but yellowish orange in basal twelfth, or black but yellowish orange in basal and apical sixths. Fore tarsus yellowish orange but telotarsus black. Mid trochantellus yellowish orange. Mid tibia mostly black, but basal fifth yellowish orange. Mid tarsus mostly yellowish orange but telotarsus black. Hind trochantellus yellowish orange. Hind tibia mostly black but yellowish orange basally. Hind tarsus mostly black but basal part of basitarsus and 4th tarsomere orange, or black but basal part of basitarsus orange. Fore wing banded: yellow, black, yellow, black, costa black. Hind wing banded: yellow, black, yellow, black apical black band complete, or banded: yellow, black, yellow.

Terga 1–4 yellowish orange. Tergum 5 black or yellowish orange. Terga 6–8 and ovipositor sheath black.

*Distribution and material examined.*—Known only from Suriname. 2♀ examined.

**Holotype** ♀. SURINAME: Boven Corantyn, Coeroeni eil., 7.x.1959, Creutzberg, (RMNH—JL000228). **Paratype**. SURINAME: 1♀, Tapanahoni Saniki, 9.v.1954, D.C. Geijskes (RMNH—JL000229).

*Etymology.*—For Michael Robertson.

***Cyclanlacidea sharkeyi* Leathers n. sp.**

Figs. 3B, 12A

*Diagnosis.*—Ovipositor sheath black with some yellowish orange in apical third (but black at apical tip) (Fig. 12A). Sutureform articulation with shallow groove (as in Fig. 7B). Strongly raised bump on petiole rectangular (as in Fig. 8B).

*Length.*—8.8–[14.1] mm.

*Head.*—Antenna with 54–58 [57] flagellomeres. Scape longer ventrally than dorsally. Scape with shelf-like process apically, lacking pre-apical shelf, 1.9–2.3 [2.2] times longer than maximally wide. First flagellomere 1.2–1.5 [1.4] times longer

than second flagellomere, 1.4–[1.6] times longer than third flagellomere. Third flagellomere [1.1]–1.3 times longer than wide. Apical flagellomere 1.8–2.3 [2.1] times longer than wide. Flagellomere length [equal to or greater than width], or distinctly less than width. Horizontal length of eye [0.7]–0.8 times longer than length of head behind eye. Transverse diameter of posterior ocellus 0.9–1.4 [1.1] times post-ocellar length. Distance between posterior ocellus and eye 3.8–5.6 [4.8] times post-ocellar length. Longitudinal bump between antennal sockets present. Facial ridges [parallel] or diverging outward straight from clypeus to antennal sockets. Deep anterior groove between antennal sockets very weak. Area between ridges filled-in creating a raised median area. Median carina on face present; developed into raised chevron or butterfly-shaped area. Area between median carina and ridges smooth. Ridges running at 45° angle from middle ridge to antennal sockets absent, or weak, or [strong]. Groove around eyes present and smooth. Eye height 1.3–1.5 [1.4] times greater than eye width; 1.0–1.2 [1.1] times greater than width of face. Width of head 1.9–2.3 [2.1] times greater than width of face. Inter-tentorial distance [1.7]–2.3 times clypeus height. Tentorio-ocular distance 1.0–1.3 [1.2] times longer than clypeus high. Clypeus completely filled in but uneven. Ventral margin of clypeus [flat], or concave. Area around clypeus with series of large crenulae and sharp ridge separating from rest of face. Face [1.1]–1.2 times wider than high. Malar suture paralleled by [2]–5 ridges. Malar space [0.2]–0.3 times eye height.

*Mesosoma.*—Mesosoma 1.4–1.7 [1.5] times longer than high. Pronotum with deep, smooth groove anteriorly. Notaulus not impressed, or [weakly impressed]. Border between mesoscutum and scutellum with carinate groove. Border between mesoscutum and scutellum lacking median carina; median area not enlarged, or

enlarged into a median pit. Propodeal spiracle oval, 1.8–[2.4] times higher than wide.

Fore tibia 1.0–[1.2] times longer than fore femur. Fore tarsus not laterally compressed, 1.5–1.7 [1.6] times longer than fore femur. Fore basitarsus 3.9–5.7 [4.3] times longer than wide, [1.7]–1.9 times longer than second tarsomere. Hind femur 3.8–[4.2] times longer than wide, 1.6–[1.8] times longer than basitarsus. Hind tibia [2.5]–2.6 times longer than basitarsus. Outer and inner hind tibial spurs 0.4 and 0.5–[0.6] times longer than hind basitarsus. Hind basitarsus 5.2–6.2 [6.1] times longer than wide.

Fore wing venation: [1M and 1cu-a intersect], or 1cu-a intersects Cu distad 1M. (RS+M)b completely tubular, or broken apically. 1M 1.8–2.1 [1.9] times longer than 1RS. 2M [3.1]–3.6 times longer than r-m. 1m-cu [1.2]–1.6 times longer than r, 1.1–1.7 [1.6] times as thick as (RS+M)a. 2RS [1.0]–1.2 times longer than r-m. 3RSa [2.9]–3.2 times longer than r-m, [5.0]–6.3 times longer than r. 3RSb [4.6]–6.0 times longer than r. C+SC+R and 1RS forming an angle of 67–73° [72°]. Fore wing length 8.7–[12.8] mm.

Hind wing vein R1a [1.3]–1.5 times longer than 1r-m.

*Metasoma*.—Base of petiole not deeply excavated. First tergite with strongly raised rectangular bump. First tergite with lateral carina closely paralleling median bump but not forming notches, lacking pair of lateral carina entirely separated from median bump. First tergite 1.1–[1.3] times longer than wide. Border between first and second tergite straight with edges curving anteriorly. Second median tergite smooth, with slightly elevated pinched-up area anteriorly. Suturiform articulation with weak, smooth, M-shaped, weakly arched groove; with carina along anterior margin. Second tergite [0.5]–0.6 times longer than wide, 0.7–0.9 [0.8] times longer than third tergite. Third tergite [0.5]–0.7 times longer than wide. Hypopygium

with convex dorsal border. Ovipositor 0.8–1.1 [1.0] times body length.

*Color*.—Yellowish orange and black. Head black except maxillary and labial palpomeres yellowish orange.

Mesosoma yellowish orange except propleuron black. Fore and mid legs yellowish orange except mid tibia sometimes black in apical quarter and telotarsus of mid tarsus black. Hind coxa black. Hind trochanter black, or yellowish orange. Hind trochantellus yellowish orange. Hind femur yellowish orange in basal half, black in apical half, or mostly black but yellowish orange in basal twelfth. Hind tibia mostly black but yellowish orange basally. Hind tarsus black. Fore wing banded: yellow, black, yellow, black, costa yellow. Hind wing yellow in basal half, black apically.

Terga 1–4 yellowish orange. Tergum 5 yellowish orange, or yellowish orange anteriorly, black posteriorly, or black dorsally, yellowish orange laterally. Tergum 6 black, or black dorsally, yellowish orange laterally, or mostly yellowish orange with some black spots anteriorly. Tergum 7 black, or black dorsally, yellowish orange laterally. Tergum 8 black. Ovipositor sheath black with some yellowish orange in apical third (but black at tip).

*Distribution and material examined*.—Known only from type locality of Dirkshoop, Suriname. 4♀♀, 1♂ examined.

*Holotype* ♀. SURINAME: Dirkshoop, 21.v.1963, J.v.d. Vecht, (RMNH—JL000203). *Paratypes*. SURINAME: Dirkshoop, 21.v.1963, J.v.d. Vecht: 3♀♀ (RMNH—JL000236, 000238, 000239), 1♂ (RMNH—JL000237).

*Remarks*.—All specimens of this species appear to have been collected with a fly-swatter or similar instrument. Some morphological characters, especially continuous ones, may be distorted in this description.

*Etymology*.—For Michael J. Sharkey of The University of Kentucky.



*Cyclaulacidea snyderorum***Leathers n. sp.**

Figs. 3A, 5F, 8B, 10C

*Diagnosis*.—Maxillary and labial palpomeres entirely black (Fig. 10C). Antenna with 46–52 flagellomeres. Facial ridges diverging outward straight from clypeus to antennal sockets (Fig. 3A). Scape longer ventrally than dorsally (Fig. 5F), 1.8–1.9 times longer than maximally wide.

*Length*.—7.2–[9.2] mm.

*Head*.—Antenna with 46–[52] flagellomeres. Scape longer ventrally than dorsally. Scape with shelf-like process apically, lacking pre-apical shelf, [1.8]–1.9 times longer than maximally wide. First flagellomere 1.3–[1.4] times longer than second flagellomere and 1.4 times longer than third flagellomere. Third flagellomere [1.1]–1.3 times longer than wide. Apical flagellomere 1.8–[1.9] times longer than wide. Flagellomere length equal to or greater than width. Horizontal length of eye 1.7 times length of head behind eye. Transverse diameter of posterior ocellus 0.9–[1.1] times post-ocellar length. Distance between posterior ocellus and eye 2.9–[3.3] times post-ocellar length. Longitudinal bump between antennal sockets present. Facial ridges diverging outward straight from clypeus to antennal sockets. Deep anterior groove between antennal sockets absent. Area between ridges filled in creating a raised median area. Median carina on face present, developed into raised chevron to butterfly-shaped area. Area between median carina and ridges [with ladder-like series of horizontal carinae], or irregular rugose, lacking any strong carinae. Ridges running at 45° angle from middle ridge to antennal sockets strong. Groove around eyes present, smooth or [crenulate]. Eye height 1.3 times greater than eye width, 1.3 times greater than width of face. Width of head 2.3–[2.4] times width of face. Inter-tentorial distance 2.5–[2.8] times clypeus height. Tentorio-ocular distance 1.1–[1.2] times longer

than clypeus high. Clypeus [partially filled in dorsally], or completely filled in but uneven. Ventral margin of clypeus concave. Area around clypeus with series of large crenulae and sharp ridge separating from rest of face. Face 1.0–[1.1] times wider than high. Malar suture paralleled by 2–[5] ridges. Malar space 0.2 times eye height.

*Mesosoma*.—Mesosoma 1.5–[1.6] times longer than high. Pronotum with deep, smooth groove anteriorly. Notaulus not impressed. Propodeal spiracle oval to [crescent-shaped], 1.9–[2.3] times higher than wide.

Fore tibia 1.1–[1.2] times longer than fore femur. Fore tarsus not laterally compressed, 1.6–[1.7] times longer than fore femur. Fore basitarsus [4.5]–5.1 times longer than wide, [1.5]–1.8 times longer than second tarsomere. Hind femur [4.0]–4.4 times longer than wide, 1.7–[1.8] times longer than basitarsus. Hind tibia 2.4–[2.6] times longer than basitarsus. Outer and inner hind tibial spurs 0.4–[0.5] and 0.6 times longer than basitarsus, respectively. Hind basitarsus [4.4]–5.2 times longer than wide.

Fore wing venation: 1M and 1cu-a intersect. (RS+M)b broken apically. 1M 1.7–2.1 [1.8] times longer than 1RS. 2M 3.2–3.5 [3.4] times longer than r-m. 1m-cu [0.9]–1.3 times longer than r, [1.5]–1.6 times as thick as (RS+M)a. 2RS 1.1–[1.2] times longer than r-m. 3RSa [2.8]–2.9 times longer than r-m, [3.8]–5.4 times longer than r. 3RSb [4.1]–5.4 times longer than r. C+SC+R and 1RS forming an angle of [70]–76°. Fore wing length 7.0–[9.1] mm.

Hind wing vein R1a [1.2]–1.4 times longer than 1r-m.

*Metasoma*.—Base of petiole deeply excavated. First tergite with strongly raised rectangular bump. First tergite with lateral carina closely paralleling median bump but not forming notches, lacking pair of lateral carinae entirely separated from median bump. First tergite [0.8]–0.9 times longer than wide. Border between first

and second tergite straight with edges curving anteriorly. Second tergite with strongly pinched-up area not reaching third tergite. Suturiform articulation with weak, smooth, V-shaped, weakly arched groove; with carina present along anterior margin. Second tergite [0.4]–0.5 times longer than wide, [0.7]–0.8 times longer than third tergite. Third tergite [0.5]–0.6 times longer than wide. Hypopygium with flat to [convex] dorsal margin. Ovipositor 1.1 times body length.

**Color.**—Entirely black except lateral parts of terga 1–3 reddish orange and sometimes basal parts of fore tarsus and entire or apical parts of hind trochantellus yellowish orange or red. Wings entirely black.

**Distribution and material examined.**—Known only from type locality at La Selva, Costa Rica. 3♀ examined.

**Holotype** ♀. COSTA RICA: Heredia: F. La Selva, 3km S. Pto. Viejo, 4.iv.1987, H.A. Hespeneheide (ESUW—JL000230). **Paratypes**. COSTA RICA: Heredia: 1♀, F. La Selva, 3km S. Pto. Viejo, 1.iv.1980, H.A. Hespeneheide (ESUW—JL000107); 1♀, LaSelva Res. Sta., 24–30.viii.1988, W.J. Hanson (EMUS—JL000101).

**Remarks.**—Coloration appears almost identical to *C. adirae*, but can be consistently distinguished using the diagnostic characters in the key.

**Etymology.**—For William E. and Amanda M. Snyder of Washington State University.

#### ACKNOWLEDGEMENTS

We thank Jill Townzen for help with ArcGIS, Gavin Broad and Donald Quicke for comments on the manuscript, and the following people who helped to provide specimens for this study: Bob Zuparko at CAS and the University of California Berkeley, Colin Brammer at EMUS, Scott Shaw at ESUW, Yaneth Muñoz-Saba at IAVH, David at MNHN, Alexandre Aguiar at MZSP, Kees van Achterberg at RMNH, Bob Wharton at TAMU, David Smith at USNM, Philip Clausen at the University of Minnesota, Joe Fortier at Saint Louis University, Henri Goulet at the Canadian National Collection, Philip Perkins at the Museum of Comparative Zoology (Harvard University), Martha Potts at the University of Kentucky, Robert Sites at the Wilbur R. Enns Entomology Museum (University of Missouri), David Wahl at the American Entomological

Institute, and Jim Wiley at the Florida State Collection of Arthropods. This work was supported by the Harold and Leona Rice Endowment for Systematic Entomology, NSF Grant DEB-0093392 to D.D. Judd, the George Ferguson Endowment Fund, and the USDA Western Forest Insect Collection. NSF Grant DEB-0205982 to Mike Sharkey supported the collecting of new specimens in Colombia.

#### LITERATURE CITED

- Achterberg, C. van. 1979. A revision of the subfamily Zelinae auct. (Hymenoptera, Braconidae). *Tijdschrift voor Entomologie* 122: 241–479.
- Arnett, R. H., G. A. Samuelsen, and G. M. Nishida. 1993. *The insect and spider collections of the world*, 2<sup>nd</sup> ed. Sandhill Crane, Gainesville, FL. 310 pp.
- Quicke, D. L. J. 1997. Subfamily Braconinae. Pp. 68–83 in: R. A. Wharton, P. M. Marsh, and M. J. Sharkey, eds. *Manual of the New World genera of the family Braconidae (Hymenoptera)*. International Society of Hymenopterists, Washington, D.C.
- Quicke, D. L. J. and A. Delobel. 1995. A new Neotropical braconine (Hym., Braconidae) parasitic on Bruchidae (Col.). *Entomologist's Monthly Magazine* 131: 215–221.
- Sharkey, M. J. and R. A. Wharton. 1997. Morphology and terminology. Pp. 19–38 in: R. A. Wharton, P. M. Marsh, and M. J. Sharkey, eds. *Manual of the New World genera of the family Braconidae (Hymenoptera)*. International Society of Hymenopterists, Washington, D.C.
- Villemant, C. and G. Simbolotti. 2000. Une nouvelle espèce de *Cyclaulacidea* parasite d'un charançon ravageur du palmier *Euterpe oleracea* au Brésil (Hymenoptera, Braconidae). *Revue française d'Entomologie (N.S.)* 22: 167–171.

#### APPENDIX 1

The following new specimens of *C. bruchivorus* were examined in this study: BRAZIL: 4♀, Rondonia, Faz. Rancho Grande, 62km S. Ariquemes, 12–22.xi.1991, E.M. Fisher (TAMU—JL000047, 000048, 000247, 000248). BOLIVIA: 1♀, Rurrenabaque, Depto. Beni, 175m, x.1956, L.E. Pena (OSUO—JL000108); 1♀, Rurrenabaque, Rio Beni, Mulford Bio. Expl., x.1921–1922, W.M. Mann (USNM—JL000245); 1♀, Huachi-Beni, Mulford Bio. Expl., ix.1921–1922, Wm.M. Mann (TAMU—JL000246). SURINAME: 1♀, Tibiti savanne, Suriname Exp. 1948–1949, 17.i.1949, D.C. Geijsskes (RMNH—JL000249); 1♀, Republiek, 10.v.1963, J.v.d.Vecht (RMNH—JL000250); 1♀, Tapanahonie, Drietabbetje, 5.v.1952, D.C. Geijsskes (RMNH—JL000251); 1♀, Cowahka, 12.iv.1962, D.C. Geijsskes (RMNH—JL000252).

The only new specimen of *C. matilei* examined in this study: COLOMBIA: 1♀, Amazonas, PNN Amacayacu, Mocagua, 150m, 12–19.iii.2000, A. Parente (IAVH—JL000201).